Transport Airplane Directorate
WG Report Format
Harmonization and New Projects

1 - BACKGROUND:

- ***This section "tells the story."***
- ***It should include all the information necessary to provide context for the planned action. Only include information that is helpful in understanding the proposal -- no extraneous information (e.g., no "day-by-day" description of Working Group's activities).***
- ***It should provide an answer for all of the following questions:***

The Design for Security Harmonization Working Group (DFSHWG) was formed to implement the provisions of Amendment 97 to Annex 8 of the Convention on International Civil Aviation. Under this amendment, eight new security rules were added to protect transport airplanes against intentional acts of destruction. These rules became effective in March 2000 for all International Civil Aviation Organization (ICAO) member states. It is the requirement of each member state to either incorporate these rules into their national regulatory codes or file for differences. The objective of the DFSHWG was to develop harmonized regulatory codes between FAA and JAA that also satisfied the ICAO regulatory intent.

After this working group was formed, FAA determined that air rage had become more prevalent and hazardous, demanding additional protections be offered to the flight crews against passengers storming the flight deck. An additional task was consequently added to the DFSHWG's role to provide requirements for intruder resistance to flight deck doors.

The resulting tasks addressed the following flight-security enhancements to airplanes:

- Systems survivability against explosive threats
- Cargo compartment fire suppression system protection against explosive and shrapnel damage
- Passenger protection against smoke, fumes and noxious vapors
- Inhibiting smoke from penetrating the flight deck from any adjacent compartments
- Identifying the location on the airplane that offers the least-risk from a suspect device
- Designing a least risk location that provides special protection against suspect devices
- Flight deck protection against small-arms fire and shrapnel
- Interior cabin designs that deter hiding and aid in finding dangerous objects
- Flight deck intrusion resistance

a. Safety Issue Addressed/Statement of the Problem

(1) What prompted this rulemaking activity (e.g., accident, accident investigation, NTSB recommendation, new technology, service history, etc.)? What focused our attention on the issue?

These proposals were prompted by international requirements in Annex 8 of the Convention on International Aviation, which were brought about in part as a result of the destruction of a Boeing Model 747 airplane near Lockerbie, Scotland on December 21, 1988, by a terrorist bomb. At the time of the Lockerbie accident, ICAO was already considering several proposals related to the incorporation of security into the design of airplanes, which had been submitted by the International Federation of Airline Pilots Association (IFALPA) to ICAO. When the Lockerbie accident occurred, ICAO was in the process of soliciting comments from certain member countries and organizations. On September 11, 2001, the United States experienced terrorist attacks when airplanes were commandeered and used as weapons. These actions further demonstrated the need to address security issues during the airplane design phase. On January 10, 2002, the FAA issued Amendment 25-106 to require that the flight-deck doors on transport category airplanes be resistant to forcible intrusion, including ballistic penetration (67 FR 2117, January 15, 2002). The amendment was issued in accordance with the requirements of Public Law 107-71, the Aviation and Transportation Security Act (the Act).

(2) What is the underlying safety issue to be addressed in this proposal?

Numerous attempts have been made to interfere and/or destroy transport airplanes through the use of weapons, a number of which were improvised explosive devices. Many of these have been successful despite the security measures taken to prevent these occurrences. Even though the goal and emphasis is to prevent dangerous objects from being place onboard transport airplanes and renewed vigor has been placed on ground detection, it is recognized that these efforts can never be fully effective. Since attempts are always taken to circumvent security inspections and are occasionally successful, these attacks must be countered with airplane designs that will both prevent concealment of weapons and ensure damage tolerance to their effects if activated before enhanced security and safety can be achieved.

(3) What is the underlying safety rationale for the requirements?

Loss of the airplane from system failures destroyed or disrupted by weapon discharges or injury to passengers is a concern. Historical evidence and several experimental trials have shown that airplanes, passengers and their crew are vulnerable to even small-sized threats, which are the most commonly exploited to escape detection. Since there is no indication that these threats will ever subside, it is prudent to bolster airplane tolerances and passenger protections with modest improvements to diminish further losses. To be effective, weapons will then have to be more substantial, thereby increasing their chances for detection.

(4) Why should the requirements exist?

These enhancements will add an additional layer of defense against direct attacks on airplanes, not only fortifying their resistance but also making them less desirable as targets.

b. CURRENT STATUS OF MEANS TO ADDRESS

(1) If regulations currently exist:

(a) What are the current regulations relative to this subject? (Include both the FAR's and JAR's.)

Other than the aforementioned amendment 25-106, there are no current regulations that relate to these proposed new rules

(b) How have the regulations been applied? (What are the current means of compliance?) If there are differences between the FAR and JAR, what are they and how has each been applied? (Include a discussion of any advisory material that currently exists.)

There are two Advisory Circulars addressing resistance to ballistic penetration and forcible intrusion. The JAA has also adopted these advisory circulars although the JAA has only recently adopted requirements similar to amendment 25-106.

(c) What has occurred since those regulations were adopted that has caused us to conclude that additional or revised regulations are necessary? Why are those regulations now inadequate?

N/A

2. If no regulations currently exist:

(a) What means, if any, have been used in the past to ensure that this safety issue is addressed? Has the FAA relied on issue papers? Special Conditions? Policy statements? Certification action items? Has the JAA relied on Certification Review Items? Interim Policy? If so, reproduce the applicable text from these items that is relative to this issue.

These safety issues were previously addressed through the voluntary participation of manufacturers identifying a location on the airplane that would provide the least risk if an improvised explosive device (IED) were found and placed at this site before it exploded while in flight.

(b) Why are those means inadequate? Why is rulemaking considered necessary (i.e., do we need a general standard instead of addressing the issue on a case-by-case basis?)?

The above approach assumed that an IED would be found before it detonated. As historical evidence has shown, this has never happened. Therefore, that approach has proven to be ineffectual and with these new rules, weapons will more likely be found or, if not found, will at least provide a lower associated risk if activated.

Since large air carrier airplanes are most often targeted on a seemingly random basis, these airplanes should comply with this protection requirement, and not left to a special condition or individual basis.

2. DISCUSSION of PROPOSAL

- *This section explains:*
  - → *what the proposal would require,*
  - → *what effect we intend the requirement to have, and*
  - → *how the proposal addresses the problems identified in Background.*
- *Discuss each requirement separately. Where two or more requirements are very closely related, discuss them together.*
- *This section also should discuss alternatives considered and why each was rejected.*

a. SECTION-BY-SECTION DESCRIPTION OF PROPOSED ACTION

(1) What is the proposed action? Is the proposed action to introduce a new regulation, revise the existing regulation, or to take some other action?

To satisfy the ICAO requirement for implementation of their new rules into national regulatory codes, the working group is submitting complementary rules and accompanying advisory circular materials to be introduced into the FAR as new regulations.

(2) If regulatory action is proposed, what is the text of the proposed regulation?

§ 25.795 Security considerations.

Except as noted in paragraphs (a) and (f) of this section, airplanes with a passenger seating capacity of more than 60 or a maximum certificated takeoff gross weight of over 100,000 pounds, must comply with the following:

* * * * *

(b) Fire and smoke protection. The airplane must be designed to limit the effects of an explosive or incendiary device, as follows:

(1) *Flight deck protection.* Means, such as would be provided by a positive pressure differential between the flight deck and surrounding areas, must be provided to limit entry of smoke, fumes and noxious vapors into the flight deck.

(2) *Cabin smoke protection.* Means must be provided to prevent passenger cabin occupant incapacitation resulting from smoke, fumes and noxious vapors as represented by the combined volumetric concentrations of 0.59% carbon monoxide and 1.23% carbon dioxide.

(3) *Cargo compartment fire suppression.* The extinguishing agent must be capable of suppressing such a fire and all cargo-compartment fire suppression-system components must be designed to withstand the following effects unless they are redundant and separated per paragraph (d) of this section or are installed remotely from the cargo compartment:

i. A 0.5-inch diameter aluminum sphere traveling at 430 ft/sec;

ii. A 15-psi pressure load if the projected surface area of the component is greater than four square feet. Any single dimension greater than four feet may be assumed to be four feet in length, and;

iii. A 6 inch displacement in any direction from a single point force applied anywhere along the distribution system due to support structure displacements or adjacent materials displacing against the distribution system.

(c) Least risk bomb location. A location on the airplane must be designed where a bomb or other explosive device may be placed to protect flight-critical structure and systems from damage in the case of detonation.

(d) Survivability of systems. Redundant airplane systems, necessary for continued safe flight and landing, must be physically separated as a minimum, except where impracticable, by an amount equal to a sphere of diameter $D = 2\sqrt{(H_0 / \pi)}$ {where H_0 is defined in § 25.365(e)(2), and D need not exceed 5.05 feet). The sphere is applied everywhere within the fuselage, limited by the forward and aft bulkheads of the passenger cabin or cargo compartments, beyond which only ½ the sphere is applied.

(e) Interior design to facilitate searches. Design features must be incorporated that will deter concealment or promote discovery of weapons, explosives or other objects from a simple inspection in any area accessible within the airplane cabin. The following areas must be addressed:

(1) Crew compartments must be placarded to be secured when not in use or must be designed so that objects can be readily detected, either through simple search or through tamper-evident designs.

(2) Stowage areas, including galleys, closets, overhead bins and miscellaneous compartments must be designed so that objects can be readily detected, either through simple search or tamper-evident designs. Contents of overhead stowage compartments must be visible to a 50th percentile male, as defined by Drefus, standing in the aisle.

(3) Stowage locations for removable or portable non-emergency equipment must be designed to near net-fit dimensions, where practicable, or the equipment must lock in place with a specialty fastener.

(4) Areas above the overhead bins must be designed to prevent placed objects from being hidden from view in a simple search from the aisle.

(5) Locks, specialty fasteners or tamper-evident seals must be provided for access doors or panels that are not intended for flight personnel or passenger use.

(6) Joints between interior panels must be designed to either preclude the introduction of objects between them or show evidence of tampering.

(7) Toilets must be designed to prevent the passage of solid objects greater than 2.0 inches in diameter.

(8) Life preservers or their storage locations must be designed in a manner such that tampering is evident.

(9) Literature pockets and magazine racks must be designed so that only one hand is needed to reveal the contents for a visual inspection.

(10) Removable cushions, without tamper evidence or the need for a specialty tool must be capable of being easily removed and visually inspected.

(f) Exceptions. Airplanes used for the carriage of cargo only, need only meet the requirements of paragraphs (b)(1), (b)(3) and (d) of this section.

(3) If this text changes current regulations, what change does it make? For each change:

- **What is the reason for the change?**
- **What is the effect of the change?**

None of these rules change any existing rules.

(4) If not answered already, how will the proposed action address (i.e., correct, eliminate) the underlying safety issue (identified previously)?

These have been previously addressed in 1.b.(2) above

(5) Why is the proposed action superior to the current regulations?

Previously discussed above

b. ALTERNATIVES CONSIDERED

(1) What actions did the working group consider other than the action proposed? Explain alternative ideas and dissenting opinions.

ICAO identified the basic framework from which we had to base our proposed actions. This mostly eliminated alternative proposals or dissenting positions. Disagreements were limited to the degree of action believed necessary to fulfill the ICAO intent. Along this line, the most significant dissent came from outside of our working group on the applicability of theses rules. Some believed that these rules should apply to all airplanes weighing over 12,500 pounds while our working group believed that they should only apply to passenger transports with more than 60 passengers or weighing at least 100,000 pounds.

(2) Why was each action rejected (e.g., cost/benefit? unacceptable decrease in the level of safety? lack of consensus? etc.)? Include the pros and cons associated with <u>each</u> alternative.

The working group and other international authorities agreed that there was no significant improvement in safety and substantial cost would be incurred by mandating these rules to passenger airplanes with fewer than 61 passengers or weighing less than 100,000 pounds. This is based in part on the lower probability of smaller airplanes being targeted and the reduced threat they pose to third parties. The smaller sized airplanes cannot be protected against the same sized threats as the larger airplanes without considerably greater costs because of size effects. This was accounted for by reducing the threat size based on the airplane size but eventually the threat size becomes so small as to be meaningless as a serious threat and protection is not warranted.

c. HARMONIZATION STATUS

(1) Is the proposed action the same for the FAA and the JAA?

Yes

(2) If the proposed action differs for the JAA, explain the proposed JAA action.

JAA is expected to produce identical requirements

(3) If the proposed action differs for the JAA, explain why there is a difference between FAA and JAA proposed action (e.g., administrative differences in applicability between authorities).

N/A

3. COSTS AND OTHER ISSUES THAT MUST BE CONSIDERED

The Working Group should answer these questions to the greatest extent possible. What information is supplied can be used in the economic evaluation that the FAA must accomplish for each regulation. The more quality information that is supplied, the quicker the evaluation can be completed.

a. COSTS ASSOCIATED WITH THE PROPOSAL

(1) Who would be affected by the proposed change? How? (Identify the parties that would be materially affected by the rule change – airplane manufacturers, airplane operators, etc.)

Airplane manufacturers, airplane operators, parts suppliers, airplane maintenance organizations, operator suppliers and security personnel will be affected by these changes. The design, installation, documentation, operation and maintenance of the airplane will all be impacted.

(2) What is the cost impact of complying with the proposed regulation? Provide any information that will assist in estimating the costs (either positive or negative) of the proposed rule.

(For example:

- *What are the differences (in general terms) between current practice and the actions required by the new rule?*
- *If new tests or designs are required, how much time and costs would be associated with them?*
- *If new equipment is required, what can be reported relative to purchase, installation, and maintenance costs?*
- *In contrast, if the proposed rule relieves industry of testing or other costs, please provide any known estimate of costs.*
- *What more-- or what <u>less</u> -- will affected parties have to do if this rule is issued?*

***NOTE**: "Cost" does not have to be stated in terms of dollars; it can be stated in terms of work-hours, downtime, etc. Include as much detail as possible.)*

This working group has made no effort to estimate the associated costs with implementing these new rules. In many cases, designs from previous arrangements will no longer be valid and design efforts will undoubtedly be extensive to find means to conform to the new requirements. However, since these requirements only apply to new type designs, the impact of design changes is minimized. Each manufacturer's organization that is responsible for each of the changes will need to estimate the cost to design, test, demonstrate compliance and build. The operators will have to estimate the in-service effects and cost associated with these changes.

b. OTHER ISSUES

(1) Will small businesses be affected? ***(In general terms, "small businesses" are those employing 1,500 people or less. This question relates to the Regulatory Flexibility Act of 1980 and the Small Business Regulatory Enforcement Fairness Act of 1996.]***

Suppliers are often used in the design, fabrication, and delivery of various components for final assembly. Often these suppliers are small businesses and could be indirectly affected by these changes. These same suppliers could be used by the air carriers for maintenance or parts suppliers.

(2) Will the proposed rule require affected parties to do any new or additional recordkeeping? If so, explain. ***[This question relates to the Paperwork Reduction Act of 1995.]***

Additional record keeping would be expected, depending on requirements assessed for the certification and maintenance efforts.

(3) Will the proposed rule create any unnecessary obstacles to the foreign commerce of the United States -- i.e., create barriers to international trade? ***[This question relates to the Trade Agreement Act of 1979.]***

There is no known unnecessary obstacle created to foreign commerce by these rules

(4) Will the proposed rule result in spending by State, local, or tribal governments, or by the private sector, that will be $100 million or more in one year? ***[This question relates to the Unfunded Mandates Reform Act of 1995.]***

The total cost to implement all of these rules by all manufacturers and air carriers is unknown at this time. The rules have been structured to enable compliance with straightforward design approaches that should keeps costs significantly below $100M.

4. ADVISORY MATERIAL

a. Is existing FAA or JAA advisory material adequate? Is the existing FAA and JAA advisory material harmonized?

There are no existing advisory materials that relate to these new rules and are therefore inadequate.

b. If not, what advisory material should be adopted? Should the existing material be revised, or should new material be provided?

As part of the working group's efforts, advisory material was developed for each of the new rules. These advisory materials are independent of existing advisory circulars and neither negate, modify nor compromise the intent of any rule or advisory circular. However, existing AC 25-9A may need to be expanded to include a test method that can be used to demonstrate compliance for one of the new requirements.

c. Insert the text of the proposed advisory material here (or attach), or summarize the information it will contain, and indicate what form it will be in (e.g., Advisory Circular, Advisory Circular – Joint, policy statement, FAA Order, etc.)

See advisory materials drafted for each rule in the attachment. These materials were harmonized so will become ACs and ACJs.

Ease of Search: FAR Part 25 .795(e)

Summary of Proposed Industry Position:

Boeing strongly supports efforts to improve the security of airplanes but the proposed FAA design regulation is not an acceptable solution.

1. The proposed FAA regulation exceeds the ICAO language and will be highly burdensome to the industry and airlines.

2. ARPs and Inspection guidelines in conjunction with minimal FAR Part 25 regulations are the appropriate response to ICAO and would result in a higher level of security.

3. Only key aspects of the proposed regulation should be adopted – All other aspects should be reconsidered in other forums.

Proposed Industry Position:

1) FAR Part 25.795(e) oversteps the ICAO recommendation which defined that "consideration" should be given to ease of search. This is in stark contrast to the ICAO flight deck statement that defined that "this door and the flight crew compartment bulkhead shall be designed..."

   The proposed rule is projected to be the most burdensome regulation since 16g seats. Furthermore, while there is a concerted desire by the airlines and industry to improve security considerations, this proposed regulation has not given due consideration to the financial factors nor evaluated the options for addressing the ICAO recommendations through other means.

   Additionally, it is projected that this regulation will also have a long-term cost impact to the airlines due to the efforts associated with maintaining the airplane in this regulated condition. None of these increased costs have been addressed with a commensurate increase in safety. Furthermore, the rule was drafted without the participation of the AEA or the ATA thus missing a key element of the airlines' input.

2) Aerospace Recommended Practices (ARPs) and operational Inspection Guidelines should be created to reduce the time associated with the inspection of interiors. Elimination of certain design features has not been justified – An inspector utilizing readily available tools such as mirrors would result in the same level of safety.

   The long-term cost of the ICAO recommendation could be significantly reduced if inspection guidelines and tools would be adopted in lieu of design constraints. For example, a mirror attached to a stick could be used much more effectively to inspect the stowage bins in lieu of regulating that stowage bins shall be visible to a 50% person from the aisle. (Note that no current Boeing airplane complies with the proposed regulation.)

   As written the proposed rule is highly subjective and it is projected that it will be very difficult to find compliance to the regulation. A companion Advisory Circular must be available in conjunction any proposed rule but most of all clear standards of compliance must be established to resolve the subjectivity of the proposed regulation.

3) The new regulation for ease of search should be limited to key features integral to the design of the airplane. For example, non-standard fasteners could be readily incorporated on access panels to reduce the potential for hiding dangerous objects.

It is Boeing's position, that by adopting this above described approach all of the ease of search recommendations of ICAO could be realized without further burdening the industry and airlines with costly design and maintenance constraints.